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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,957	04/02/2004	Kei MURAYAMA	040137	2956
23850	7590	03/30/2005	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			PADGETT, MARIANNE L	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 03/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/708,957	Applicant(s) MURAYAMA ET AL.	
	Examiner Marianne L. Padgett	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12/2/04, 9/21/04 & 4/5/04.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 7-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/21/04, 4/5/04</u> . | 6) <input type="checkbox"/> Other: _____  |

*Re*

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1. Applicant's election without traverse of group I, method claims 7-13 in the reply filed on December 2, 2004 is acknowledged.

2. While not technically a formal problem, applicants may wish to note that "an ultraviolet ray" is singular, hence implies one photon, whereas language such as --ultraviolet rays-- or --ultraviolet irradiation-- (as found in Fig. 6B or C) indicate plural photons or UV radiation in general. As Fig. 1, described on [2004] discussed "UV lamp 22a emits the ultraviolet ray...", applicants do not appear to mean a single ray as photon, since normally a lamp is not capable of only emitting one UV ray, so support for amending the claim and specification language which illogically and misleading by refers to UV "ray" in the singular is present. Note also if plural rays are used, one ray is encompassed thereby.

3. The disclosure is objected to because of the following informalities: proofreading of the specification to correct non-idiomatic and scientifically misleading phrasing, particularly the "ultraviolet ray" (singular) discussed above.

Appropriate correction is required.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as

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a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 7, 11 and 13 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Griffith et al (6,348,295 B1).

Griffith et al teach metal patterning via a liquid that may be deposited in pattern via the ink jet technique, then irradiated with radiation, such as UV, to produce a conductive pattern that may be metals, such as Au or Ag. The liquid source material is taught to be a colloidal suspension of nanoparticles (Au, Ag), with capping groups, exemplified by hydrocarbons with basic (amines) or acidic (carboxylic) terminal groups, which are removed by the applied energy, which also fuses the nanoparticles. Griffith et al teach that the optimal wavelength when laser radiation or radiation through a photomask is used, is determined by the particular nanoparticle and desired feature size, and may be UV. When the solution is patterned, as applied, a heated substrate may also be employed. The deposited material may be dried by heating, before or after the fusing stop. See the Abstract; Figures; Summary, especially col. 2, lines 56-57; col. 3, lines 9-25; col. 4, lines 10-22 & 30; col. 5, line 40 & 56-65; and col. 6, lines 28-37.

6. Claims 7-10 and 13 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Narang (6,855,378 B1).

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In their background on col. 1, lines 59-67, Narang teach it is known to coat a substrate with a reducible metal complex, such as a sorbitol copper formate solution, mask and expose to UV to reduce exposed areas to Cu metal, thus reading on applicants' claims 7-8 as presently written.

For his process, Narang teaches deposition of redox couple solutions that may contain metal salts of Cu, Au, Ni or Pd, such as gold thiocyanate (a salt of HOCN, cyanic acid which contains cyanide), where the ink jet method may be employed to deposit the solution into patterns, which may result in pure metal patterns, after initiating the redox reaction with an energy source that may be ultraviolet rays. It is also mentioned that the substrate may be heated, but not taught to combine such with radiation energization. See the abstract; Fig. 1 & 9; col. 4, lines 28-31 & 41-54, especially 51-53; col. 5, lines 23-25; col. 7, line 66-col. 8, line 29+, especially 4-6; col. 9, lines 52-67+; col. 10, lines 23-27 & 37-52; col. 11, lines 24-40+; col. 12, line 18-col. 13, line 7+, especially col. 12, lines 28-29 & 45-52; and col. 18, lines 35-67 for advantageous features.

7. Claims 7-9 and 12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hongo et al (4,444,801).

Hongo et al teach applying a metal-organic complex solution to a photomask with defects to be corrected, and irradiating those defects with laser light that may be UV, where the exposure time is controlled to correspond to desired deposit, hence essentially reading on controlling thickness thereby as in applicants' claim 12. Exemplary metals include Ag, Co, and Cu, etc. See the Abstract; col. 1, lines 35-50; col. 2, lines 9-25; col. 3, lines 44-50+; col. 4, line 49-col. 5, lines 3, 34-50 & 67- col. 6, lines 9 & 54-66; col. 7, lines 10-17 & 41-col. 8, line 60 (metal complexes lines 3-53); col.9+ (more complexes, line 61, Cu complexes); col. 11, lines 53-63; col. 12, lines 46-59+; col. 13, lines 4-11 & 43-56; and claims. While it is noted that Hongo et al may dry their metal-complex film before irradiating, their claimed process does not require it and col. 12, line 51 indicates that drying is only done when necessary, hence as taught, UV irradiation may be applied to the liquid state of the solution film, reading on applicants' claimed

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process. Alternately, given the "when necessary..." statement, it would have been obvious to one of ordinary skill in the art that drying of the deposited film need not be performed if the solvent used does not interfere with the irradiation process, and the deposit is stable (will stay in place) for the purposes of irradiating to produce a patterned film of desired proportions.

8. Claims 7-9 and 12 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Baum et al (6,022,596).

In Baum et al, see the abstract and flowchart; col. 1, line 65-col. 2, line 16; col. 3, lines 21-33 & 64-col. 4, line 50; col. 5, lines 23-33 & 62-col. 6, line 40+; col. 10, lines 19-33 & 50-65; and claims, for depositing a coating of photosensitive solution containing a metal-complex, which is UV exposed in a pattern to form a metal seeding layer using metals, such as Pd or Au. Intensity of radiation is controlled between 20-180 mJ/cm<sup>2</sup>, as less produces insufficient reaction, and greater tends to cause oxide deposition. Control of intensity along with time of exposure gives the dose, and thus inherently effects the thickness of deposit, which Baum et al recommend to be between 20-60 Å (col. 5-6).

9. Claims 7-9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ishikawa et al (5,405,656).

Ishikawa et al teach forming a catalytic metal (Au, Ag, Pt or Pd) pattern on a substrate by applying (dip-coat, brush, LB technique) a solution with a metal complex, then irradiation (UV), or immersing and irradiating while immersed in the solution. The metal is taught to only deposit where irradiated. See the Abstract; Fig. 3-5; col. 3, line 31-col. 4, line 24 & 64-col. 5, line 60+, especially 45-50; col. 6, line 30-col. 7, line 40, especially col. 6, lines 35-39 & 60-65; and col. 7, line 23-31; etc.

10. Other art of interest include Bravo Vasquez et al (2002/0197415 A1; the Abstract; Figures; [0026-28]; [0043+]; [0064+]; [0068+] and claims); and Denella et al (4,098,922; col. 4-6) is equivalent to above references for rejection of claims 7-9.



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11. Claims 7-9 and 11 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Morishita (5,314,725).

In Morishita, see the Abstract; col. 2, lines 1-35; col. 5, lines 9-33 & 51-col. 6, line 53, especially col. 5, line 12 (Cu, Ni) and 56 (Au, Pd) in plating solutions and col. 6, line 4 (UV); col. 7, lines 17-33 (complexing agents); col. 8, lines 9-23 (salts of a metal, reducing agent and complexing agent); examples col. 8-18, especially Ex. 3 which immerses the substrate in a heated plating solution, thus heating the substrate, and irradiates with a Hg-lamp (with IR filtered out as used in Ex. 1), which is a UV source, to plate Ni (or Cu).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Padgett/am

March 16, 2005

March 25, 2005



MARIANNE PADGETT  
PRIMARY EXAMINER